

*MAKI et al.*

*Application No. 09/982,988*

*November 10, 2003*

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A vehicular control device having a self-diagnosis function for informing occurrence of abnormality in at least one diagnosis target by controlling at least one malfunction indicator light (MIL) in such a manner that operation of said at least one MIL is selected from one of lighting-on, flashing and lighting-off based on a result of a malfunction detection operation of each one of said at least one diagnosis target, said vehicular control device comprising an object oriented self-diagnosis program stored therein for implementing said self-diagnosis function, said object oriented self-diagnosis program including:

at least one malfunction-information storing object (~~300~~) that specifies a control instruction for instructing a control operation of said at least one MIL to be a selected condition with respect to malfunction information of said each one of said at least one diagnosis target based on said malfunction information of said each one of said at least one diagnosis target, said selected condition being one of the following possible conditions: lighting-on, flashing and lighting-off, and said malfunction information of said each one of said at least one diagnosis target being determined based on said result of said malfunction detection operation of said each one of said at least one diagnosis target in view of a level of malfunction of said each one of said at least one diagnosis target; and

a malfunction-information managing object that carries out adjustment of said control instruction of said at least one MIL specified by said at least one malfunction-information storing object based on said malfunction information of said each one of said at least one diagnosis

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target and outputs MIL information for controlling said at least one MIL based on a result of said adjustment of said control instruction of said at least one MIL.

2. (original) A vehicular control device according to claim 1, wherein:

said at least one malfunction-information storing object stores said malfunction information of said each one of said at least one diagnosis target; and

said malfunction-information managing object commands said at least one malfunction-information storing object to store said malfunction information of said each one of said at least one diagnosis target based on said result of said malfunction detection operation of said each one of said at least one diagnosis target.

3. (original) A vehicular control device according to claim 1, wherein each one

of said at least one malfunction-information storing object is prepared for each corresponding one of said at least one diagnosis target or is prepared for each corresponding one of at least one malfunction check item that corresponds to said at least one diagnosis target, respectively.

4. (original) A vehicular control device according to claim 1, wherein:

said at least one malfunction-information storing object stores relationship information indicative of relationship between said malfunction information and said control instruction; and

said at least one malfunction-information storing object specifies said control instruction of said at least one MIL based on said relationship information.

5. (original) A vehicular control device according to claim 1, wherein said at least one malfunction-information storing object specifies said control instruction based on said malfunction information of said each one of said at least one diagnosis target when a request for retrieving said control instruction is received from said malfunction-information managing object.

6. (original) A vehicular control device according to claim 1, wherein:  
said control instruction is selected from a plurality of control instructions having different predetermined priority levels; and  
said malfunction-information managing object outputs one of said control instructions having a highest priority level as said MIL information.

7. (currently amended) A vehicular control device having a self-diagnosis function for informing occurrence of abnormality in at least one diagnosis target by controlling at least one malfunction indicator light (MIL) in such a manner that operation of said at least one MIL is selected from one of lighting-on, flashing and lighting-off based on a result of a malfunction detection operation of each one of said at least one diagnosis target, said vehicular control device comprising an object oriented self-diagnosis program stored therein for implementing said self-diagnosis function, said object oriented self-diagnosis program including:  
a malfunction-information managing object that outputs MIL information for controlling said at least one MIL when a request for controlling said at least one MIL is received to operate in a selected condition, said selected condition being one of the following possible conditions: lighting-on, flashing and lighting-off, and said request for controlling said at least one MIL being

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different from a request for executing said malfunction detection operation of said each one of said at least one diagnosis target.

8. (original) A vehicular control device according to claim 7, wherein said object oriented self-diagnosis program further includes at least one malfunction-information storing object that stores malfunction information of said each one of said at least one diagnosis target determined based on said result of said malfunction detection operation of said each one of said at least one diagnosis target in view of a level of malfunction of said each one of said at least one diagnosis target, wherein:

said malfunction-information managing object commands said at least one malfunction-information storing object to store said malfunction information of said each one of said at least one diagnosis target based on said result of said malfunction detection operation of said each one of said at least one diagnosis target; and

said malfunction-information managing object outputs said MIL information for controlling said at least one MIL based on said malfunction information of said each one of said at least one diagnosis target stored by said at least one malfunction-information storing object.

9. (original) A vehicular control device according to claim 1, wherein said malfunction-information managing object outputs said MIL information when a request for controlling said at least one MIL is received, said request for controlling said at least one MIL being different from a request for executing said malfunction detection operation of said each one of said at least one diagnosis target.

10. (currently amended) A vehicular control device having a self-diagnosis function for informing occurrence of abnormality in at least one diagnosis target by controlling at least one malfunction indicator light (MIL) in such a manner that operation of said at least one MIL is selected from one of lighting-on, flashing and lighting-off based on a result of a malfunction detection operation of each one of said at least one diagnosis target, said vehicular control device comprising an object oriented self-diagnosis program stored therein for implementing said self-diagnosis function, said object oriented self-diagnosis program including:

a malfunction-information managing object that outputs MIL information for controlling said at least one MIL to operate in a selected condition, said selected condition being one of the following possible conditions: lighting-on, flashing and lighting-off; and

an MIL controlling object for controlling said at least one MIL based on said MIL information outputted from said malfunction-information managing object.

11. (currently amended) A vehicular control device having a self-diagnosis function for informing occurrence of abnormality in at least one diagnosis target by controlling at least one malfunction indicator light (MIL) in such a manner that operation of said at least one MIL is selected from one of lighting-on, flashing and lighting-off based on a result of a malfunction detection operation of each one of said at least one diagnosis target, said vehicular control device comprising an object oriented self-diagnosis program stored therein for implementing said self-diagnosis function, said object oriented self-diagnosis program including:

at least one malfunction-information storing object that stores malfunction information of said each one of said at least one diagnosis target determined based on said result of said

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malfunction detection operation of said each one of said at least one diagnosis target in view of a level of malfunction of said each one of said at least one diagnosis target;

a malfunction-information managing object that commands said at least one malfunction-information storing object to store said malfunction information of said each one of said at least one diagnosis target based on said result of said malfunction detection operation of said each one of said at least one diagnosis target, said malfunction-information managing object outputting MIL information for controlling said at least one MIL to be a selected condition based on said malfunction information of said each one of said at least one diagnosis target stored by said at least one malfunction-information storing object, said selected condition being one of the following possible conditions: lighting-on, flashing and lighting-off; and

an MIL controlling object for controlling said at least one MIL based on said MIL information outputted from said malfunction-information managing object.

12. (original) A vehicular control device according to claim 1, wherein said object oriented self-diagnosis program further includes an MIL controlling object for controlling said at least one MIL based on said MIL information outputted from said malfunction-information managing object.

13. (original) A vehicular control device according to claim 7, wherein said object oriented self-diagnosis program further includes an MIL controlling object for controlling said at least one MIL based on said MIL information outputted from said malfunction-information managing object.

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14. (currently amended) An object oriented self-diagnosis program that implements a self-diagnosis function for informing occurrence of abnormality in at least one diagnosis target provided in a vehicle by controlling at least one malfunction indicator light (MIL) in such a manner that operation of said at least one MIL is selected from one of lighting-on, flashing and lighting-off based on a result of a malfunction detection operation of each one of said at least one diagnosis target, said object oriented self-diagnosis program comprising:

at least one malfunction-information storing object that specifies a control instruction for instructing a control operation of said at least one MIL with respect to malfunction information of said each one of said at least one diagnosis target to be a selected condition based on said malfunction information of said each one of said at least one diagnosis target, said selected condition being one of the following possible conditions: lighting-on, flashing and lighting-off, and said malfunction information of said each one of said at least one diagnosis target being determined based on said result of said malfunction detection operation of said each one of said at least one diagnosis target in view of a level of malfunction of said each one of said at least one diagnosis target; and

a malfunction-information managing object that carries out adjustment of said control instruction of said at least one MIL specified by said at least one malfunction-information storing object based on said malfunction information of said each one of said at least one diagnosis target and outputs MIL information for controlling said at least one MIL based on a result of said adjustment of said control instruction of said at least one MIL.

15. (original) An object oriented self-diagnosis program according to claim 14, wherein:

said at least one malfunction-information storing object stores said malfunction information of said each one of said at least one diagnosis target; and

said malfunction-information managing object commands said at least one malfunction-information storing object to store said malfunction information of said each one of said at least one diagnosis target based on said result of said malfunction detection operation of said each one of said at least one diagnosis target.

16. (original) An object oriented self-diagnosis program according to claim 14, wherein each one of said at least one malfunction-information storing object is prepared for each corresponding one of said at least one diagnosis target or is prepared for each corresponding one of at least one malfunction check item that corresponds to said at least one diagnosis target, respectively.

17. (original) An object oriented self-diagnosis program according to claim 14, wherein:

said at least one malfunction-information storing object stores relationship information indicative of relationship between said malfunction information and said control instruction; and

said at least one malfunction-information storing object specifies said control instruction of said at least one MIL based on said relationship information.

18. (original) An object oriented self-diagnosis program according to claim 14, wherein said at least one malfunction-information storing object specifies said control instruction based on said malfunction information of said each one of said at least one diagnosis target when



a request for retrieving said control instruction is received from said malfunction-information managing object.

19. (original) An object oriented self-diagnosis program according to claim 14, wherein:

said control instruction is selected from a plurality of control instructions having different predetermined priority levels; and


said malfunction-information managing object outputs one of said control instructions having a highest priority level as said MIL information.

20. (currently amended) An object oriented self-diagnosis program that implements a self-diagnosis function for informing occurrence of abnormality in at least one diagnosis target provided in a vehicle by controlling at least one malfunction indicator light (MIL) in such a manner that operation of said at least one MIL is selected from one of lighting-on, flashing and lighting-off based on a result of a malfunction detection operation of each one of said at least one diagnosis target, said object oriented self-diagnosis program comprising:

a malfunction-information managing object that outputs MIL information for controlling said at least one MIL to be a selected condition when a request for controlling said at least one MIL is received, said selected condition being one of the following possible conditions: lighting-on, flashing and lighting-off, and said request for controlling said at least one MIL being different from a request for executing said malfunction detection operation of said each one of said at least one diagnosis target.

21. (original) An object oriented self-diagnosis program according to claim 20, further including at least one malfunction-information storing object that stores malfunction information of said each one of said at least one diagnosis target determined based on said result of said malfunction detection operation of said each one of said at least one diagnosis target in view of a level of malfunction of said each one of said at least one diagnosis target, wherein:

said malfunction-information managing object commands said at least one malfunction-information storing object to store said malfunction information of said each one of said at least one diagnosis target based on said result of said malfunction detection operation of said each one of said at least one diagnosis target; and

 said malfunction-information managing object outputs said MIL information for controlling said at least one MIL based on said malfunction information of said each one of said at least one diagnosis target stored by said at least one malfunction-information storing object.

22. (original) An object oriented self-diagnosis program according to claim 14, wherein said malfunction-information managing object outputs said MIL information when a request for controlling said at least one MIL is received, said request for controlling said at least one MIL being different from a request for executing said malfunction detection operation of said each one of said at least one diagnosis target.

23. (currently amended) An object oriented self-diagnosis program that implements a self-diagnosis function for informing occurrence of abnormality in at least one diagnosis target provided in a vehicle by controlling at least one malfunction indicator light (MIL) in such a manner that operation of said at least one MIL is selected from one of lighting-

on, flashing and lighting-off based on a result of a malfunction detection operation of each one of said at least one diagnosis target, said object oriented self-diagnosis program comprising:

a malfunction-information managing object that outputs MIL information for controlling said at least one MIL to be a selected condition, said selected condition being one of the following possible conditions: lighting-on, flashing and lighting-off; and

an MIL controlling object for controlling said at least one MIL based on said MIL information outputted from said malfunction-information managing object.

24. (currently amended) An object oriented self-diagnosis program that implements a self-diagnosis function for informing occurrence of abnormality in at least one diagnosis target provided in a vehicle by controlling at least one malfunction indicator light (MIL) in such a manner that operation of said at least one MIL is selected from one of lighting-on, flashing and lighting-off based on a result of a malfunction detection operation of each one of said at least one diagnosis target, said object oriented self-diagnosis program comprising:

at least one malfunction-information storing object that stores malfunction information of said each one of said at least one diagnosis target determined based on said result of said malfunction detection operation of said each one of said at least one diagnosis target in view of a level of malfunction of said each one of said at least one diagnosis target;

a malfunction-information managing object that commands said at least one malfunction-information storing object to store said malfunction information of said each one of said at least one diagnosis target based on said result of said malfunction detection operation of said each one of said at least one diagnosis target, said malfunction-information managing object outputting MIL information for controlling said at least one MIL to be a selected condition based on said

malfunction information of said each one of said at least one diagnosis target stored by said at least one malfunction-information storing object, said selected condition being one of the following possible conditions: lighting-on, flashing and lighting-off; and  
an MIL controlling object for controlling said at least one MIL based on said MIL information outputted from said malfunction-information managing object.

25. (original) An object oriented self-diagnosis program according to claim 14, further comprising an MIL controlling object for controlling said at least one MIL based on said MIL information outputted from said malfunction-information managing object.


26. (original) An object oriented self-diagnosis program according to claim 20, further comprising an MIL controlling object for controlling said at least one MIL based on said MIL information outputted from said malfunction-information managing object.

27. (new) A vehicular control device according to claim 1, wherein the result of the malfunction detection operation of each one of said at least one diagnosis target is categorized into at least three levels, which include normal, temporarily abnormal and abnormal.

28. (new) A vehicular control device according to claim 7, wherein the result of the malfunction detection operation of each one of said at least one diagnosis target is categorized into at least three levels, which include normal, temporarily abnormal and abnormal.

29. (new) A vehicular control device according to claim 10, wherein the result of the malfunction detection operation of each one of said at least one diagnosis target is categorized into at least three levels, which include normal, temporarily abnormal and abnormal.

30. (new) A vehicular control device according to claim 11, wherein the result of the malfunction detection operation of each one of said at least one diagnosis target is categorized into at least three levels, which include normal, temporarily abnormal and abnormal.

 31. (new) An object oriented self-diagnosis program according to claim 14, wherein the result of the malfunction detection operation of each one of said at least one diagnosis target is categorized into at least three levels, which include normal, temporarily abnormal and abnormal.

32. (new) An object oriented self-diagnosis program according to claim 20, wherein the result of the malfunction detection operation of each one of said at least one diagnosis target is categorized into at least three levels, which include normal, temporarily abnormal and abnormal.

33. (new) An object oriented self-diagnosis program according to claim 23, wherein the result of the malfunction detection operation of each one of said at least one diagnosis target is categorized into at least three levels, which include normal, temporarily abnormal and abnormal.

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34. (new) An object oriented self-diagnosis program according to claim 24,

wherein the result of the malfunction detection operation of each one of said at least one diagnosis target is categorized into at least three levels, which include normal, temporarily abnormal and abnormal.

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